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ABSTRACT

This guide is designed for teachers, administrators, inservice leaders, and teacher educators. Its purpose is to provide an organizational framework, material, and resources for the development of instructional plans and strategies for incorporating regional environmental planning in the secondary school curriculum. The guide is divided into three major parts. The first relates the role of regional environmental planning in solving some of today's environmental problems. The second part defines and describes regional environmental planning. It covers transportation, water supply, pollution control, waste disposal, and material recycling. The third part presents steps in introducing regional environmental planning into the school or community education programs. Information sources, implementation guidelines, and sample activities are included. (Author/MA)

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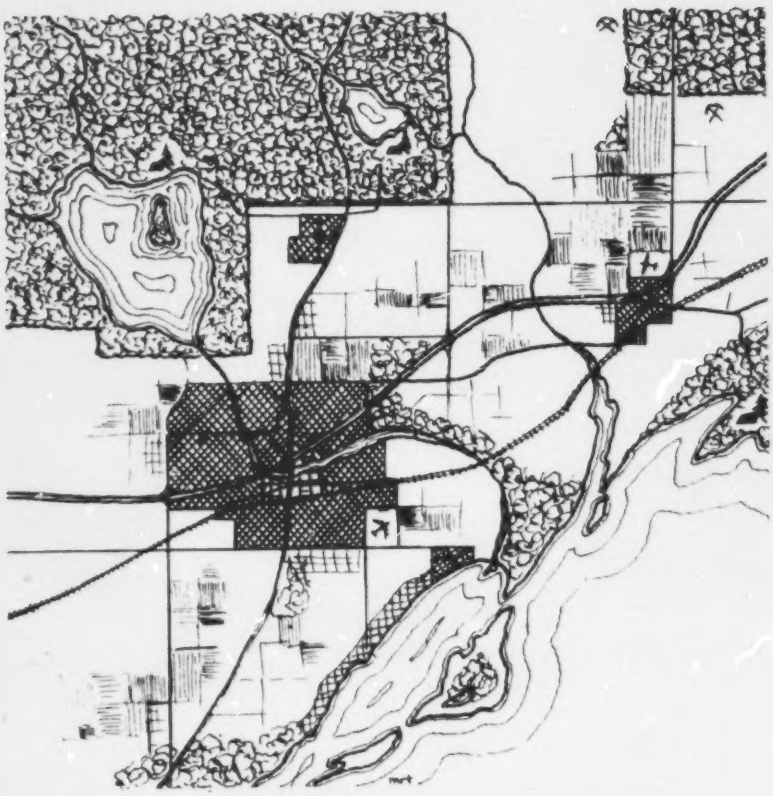
A GUIDE FOR TEACHING REGIONAL ENVIRONMENTAL PLANNING



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A GUIDE FOR TEACHING REGIONAL ENVIRONMENTAL PLANNING

Final Report of Project - Inservice Personnel Development: Regional Environmental Planning Workshops for Tri-County Secondary School Teachers

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ABOUT THE GUIDE . . .

A Guide for Teaching Regional Environmental Planning has been prepared for teachers, administrators, inservice leaders, and teacher educators. The purpose of the Guide is to provide an organizational framework, material, and resources for the development of instructional plans and strategies for incorporating regional environmental planning in the secondary school curriculum.

During the 1977-1978 school year, the Science and Mathematics Teaching Center at Michigan State University offered a series of workshops designed to present regional environmental planning as an important focus of environmental education in school curricula. This Guide is a by-product of the workshop experiences, interactions among participant teachers, staff, and guest speakers, and research conducted by project staff.

A Guide for Teaching Regional Environmental Planning has been divided into three major parts. The first part includes a discussion of some of the environmental problems we face today and shows how regional environmental planning can help us learn about and solve such problems. This section details the purposes, objectives, and results of the workshops.

The second section of the Guide is a discussion of what regional environmental planning is, who is involved in it, what it accomplishes, and when it is necessary. The planning process is defined and described according to the specialized language of environmental and regional planning concepts. And, since proper land use is the focal point of planning, it becomes necessary to discuss property rights, land use problems, and what can be done to make land use planning easier. Each major area pertinent to regional planning (transportation, water supply, pollution control, waste disposal and material recycling) is covered briefly. Finally the implementation of regional planning is examined by a review of regional organizations, their history, functions, and the problems they face due to interagency and citizen reactions. This section contains source material which teachers can utilize to gain a substantive background in planning and the planning process. It could also be used by teachers in preparing a teaching unit in regional environmental planning.

The third part of the Guide presents steps in introducing regional environmental planning into the school and/or community education program. It lists sources of information available to the teachers in formulating their teaching units or in providing a subject matter orientation. It offers a framework for incorporating the information into new teaching units, into units already being taught, or into related class discussions. Guidelines for implementing new courses into the school are also listed, along with a sample of activities (pertaining to regional environmental planning) which could be conducted in a classroom.

As part of the continuing grant, a Supplement to this Guide will be available upon request during the summer of 1979. The Supplement will contain added information and resources helpful in teaching regional environmental planning.

I. INTRODUCTION

Protection of the environment has been an issue of growing concern to all of us. In the United States, the environmental movement of recent years has brought about an increasing awareness in the workings of nature as well as the realization that man can indeed make an impact on his environment. As a result of painstaking research, forward-thinking planning, and societal pressure, our government recognized the need to curb environmental destruction, clean up pollution, and conserve resources for our present and future use.

Once we have identified a specific problem, we must find some means to solve it. We define our objectives or goals in order to use our resources in the most effective way to achieve the greatest benefit. We try to find out as much about the problem as we can to make sure that we have discovered as many alternative solutions as possible. We choose the best or most practical solution and then proceed to try it on the problem. If the first solution does not work exactly right, we change it or look for a new one. This process is essentially what environmentalists and government leaders do in striving to achieve a healthful, attractive, and quality environment. The process is called planning or, more specifically, environmental planning. Decision makers use information from a wide variety of sources--economics, sociology, politics, ecology, and many others--to help them formulate plans which will, hopefully, lead to a more livable environment.

Many of the problems experienced by individuals and communities, however, are becoming more complex. Concerns such as air and water pollution, resource availability and use, waste disposal, adequate transportation facilities, and growing urbanization go beyond the range of local governments' powers to plan effectively for their solutions. Often, the problems are just too big, too complicated, and too expensive. As a result, individual communities, sharing common desires and common problems, have found it necessary to combine their efforts into regional planning organizations. A region is a logical common ground for solving environmental problems because air and water pollution or urban sprawl do not recognize political boundaries or legal jurisdictions. Individual communities who identify themselves as part of a region, using collective action, cooperation, and coordination, can be the beginning of the solution to environmental problems.

There are, however, major obstacles to effective regional planning. One of these obstacles is the lack of public understanding about the nature of regional planning and the need for its widespread application. Students and parents alike are aware that decisions concerning the environment affect their lives, yet they do not fully comprehend all of the facts behind such decisions, nor do they understand the processes by which these decisions are made. Regional environmental planning is also slow in gaining acceptance because of the conflicts between local and higher-level governments. Traditionally, many decisions concerning land use and environmental quality have been the responsibility of individuals and local governments will lose a considerable amount of their power. Many feel that people have more "say" in local governmental processes and contend that most individuals are unable

to influence larger, more distant governmental units.

Because of the limited recognition of the importance of regional collective action in planning for environmental improvement, it is the purpose of this project to assist secondary school teachers of science and social studies in developing their own regional consciousness so they can, in turn, educate their students about the place of regional environmental planning within our democratic framework of government. By using a regional planning framework in environmental education, teachers provide a meaningful integration of multidisciplinary information and an improved understanding of planning. With this knowledge, they can structure the education curriculum of their schools (lessons, activities, courses) and community programs to reflect a greater regional environmental awareness. Moreover, they can then help their students apply the knowledge of science, technology, economics, politics, and other subjects along with skills for influencing democratic decision making to achieve desirable and more effective goals.

Environmental Planning Workshops

In 1974, the Ford Foundation presented a list of generalizations related to the management of the environment on a regional basis. The list defined those areas of concern to leaders who were attempting to initiate a regional consciousness in environmental decision making. The relevant generalizations included of the following concerns:

(1) The process of having public officials, academics, and citizens agree to solutions of regional environmental problems has been much slower than anticipated.

(2) Analysts and researchers are often impatient with what is perceived as government and citizen preoccupation with short-range rather than long-range planning.

(3) There is a need to communicate the results of technical planning, computer modeling, and computer simulation to decision makers and citizens in terms they can understand.

(4) There is a need for the analysts and researchers to have feedback from the public concerning priorities, value structures, and goal sets.

These generalizations point to the value of school curricula devoted to helping future decision makers and voters in determining and understanding the issues concerning regional environmental planning. Communicating the concept of regional consciousness to all people whose lives can be both positively and negatively affected by the daily decisions made by their governmental representatives is a logical role of the education system.

To help secondary school teachers develop an understanding of the need and procedures for sound regional environmental planning and to assist them in incorporating these ideas in their local school curricula, the Science and

Mathematics Teaching Center at Michigan State University designed and concuted a series of workshops during the 1977-1978 school year. Participants of the workshop included science and social science teachers from school districts of Eaton, Clinton, and Ingham Counties, which comprise the Tri-County Region located in the Greater Lansing area of south-central Michigan.

Workshop participants were selected on the basis of their interest in environmental education and its goals, their concern about environmental issues, and their demonstrated performance as leaders in their schools. All of the teachers were highly recommended by their superviosrs, and it was hoped that these supervisors were willing to provide each teacher with opportunities to apply the learnings from the workshops to their classes, school, and community.

The fifty-seven teachers from the three counties, represented a wide variety of backgrounds and experience which proved beneficial to group interaction. This interaction made possible exchange of information and mutual assistance both among the teachers and between the staff and the teachers. Participants were distributed as follows:

26 Senior High Science Teachers
3 Senior High Science Teachers
9 Junior High Science Teachers
4 Junior High Social Science Teachers
5 Middle School Science Teachers
6 Middle School Social Science Teachers
2 Elementary School Teachers
2 Principals or Administrators

The workshop staff included two faculty members from the Science and Mathematics Teaching Center who organized and conducted each workshop, plus three graduate assistants. Thr project staff assisted the teachers in interpreting the content of the workshops and adapting that information into teaching units in their schools. In addition, the graduate assistants set up meetings with the individual teachers to discuss the workshops and help implement their teaching units. This provided more personal attention to each teacher's needs and goals as well as assistance in invorporating new ideas in local programs.

Speakers who addressed the workshops included Michigan State University faculty members with expertise in planning and resource use, representatives of state and local governments, planning specialists from state and regional organizations, and leaders of special interest groups. A list of all workshop participants, speakers, and topics is provided in the Appendix.

The objectives of the workshops addressed three areas: (1) subject matter content--improving participants' understanding of concepts and principles underlying regional environmental planning; (2) development of process skills--improving participants' competence in information retrieval and in utilizing social and political processes, especially in influencing decision making; and (3) improvement of instruction--extending participants' knowledge of and skill in using instructional resources and curriculum improvement strategies.

Subject matter content includes some familiarity with concepts drawn from both natural sciences and social sciences. The teacher should develop an understanding of and achieve competency in teaching the following basic concepts and principles:

(a) land use factors (such as aesthetics, soil type, geologic structure, etc.) and the politics and economics of alternative uses;

(b) community water supply systems and treatment processes;

(c) solid waste disposal systems and technologies;

(d) regional air quality standards and pollution control technologies;

(e) factors and alternatives in transportation systems;

(f) elements of environmental impact statements; and

(g) purposes and interrelationships found in governmental and private agencies which influence environmental planning.

Developing and teaching process skills is important if citizens are to have confidence and competence in influencing decision making at all levels of government. These skills involve:

(a) identifying processes which individuals and groups can use to influence governmental decision making;

(b) using accurate and complete information to substantiate and argue for or against an issue;

(c) communicating ideas to government officials; and

(d) analyzing controversial issues.

Improving instruction is important for the teacher in communicating the content and goals of the regional environmental planning process. The following objectives are directed toward extending the teacher's knowledge of and skill in using instructional resources in science, social science, and/or environmental education programs. This process also has a valid application in a schoolwide or even community involvement program. Teachers should be able to:

(a) collect and evaluate source materials that can be used to teach the need for and processes of regional environmental planning;

(b) utilize materials such as simulation games, activities, or models where applicable;

(c) formulate a pilot plan for teaching regional environmental planning in their own subjects, with their fellow teachers, or on a schoolwide basis; and

(d) work with fellow teachers and administrators in implementing education programs.

The workshops provided a forum for information exchange and interaction between workshop participants and interested persons from state and local government agencies, MSU, and the Tri-County Regional Planning Commission. During the workshops, the participants were given a sound background in regional planning problems and state-of-the-art technological, political, and social solutions. They were also given the opportunity to talk with local, regional, and state leaders about individual topics which they could teach in their schools. Although many of the ideas for teaching regional environmental planning were developed after the beginning of the school year, a significant number of the teachers were able to include environmental issues in the subject matter they were currently teaching or plan new units for subsequent years.

The workshop participants also gained a better understanding of environmental education. Teachers who had previously considered environmental education only as a class trip to the school woodlot now talked about the planning and environmental implications of a proposed highway or a new community sewage treatment plant. Teachers began helping their students understand local and regional issues. Students attended meetings, wrote to legislators, became more familiar with current events, and, generally, developed study plans which they used for college credit to further their own educational development.

The impact of these workshops has not yet been fully realized. The participants acquired new concepts and skills regarding regional environmental planning and new techniques for incorporating it in the curriculum of their schools. In the months and years ahead, these dedicated teachers will collaborate on the basic ideas presented in the workshops as they develop and implement new programs and teaching units designed to prepare the young people of the Tri-County Region for more effective citizenship. Moreover, this Guide for Teaching Regional Environmental Planning provides others with a brief introduction to topic and its possible inclusion in the curriculum.

II. REGIONAL ENVIRONMENTAL PLANNING - SOURCE MATERIAL

Regional Environmental Planning is the result of a combination of two influences: the environmental movement and the public planning movement. Their new-found association has opened up a new way of looking at planning and man-nature interactions.

The Environmental Movement

In order to examine our changing attitudes toward the environment, it is helpful to become familiar with some of the history behind the environmental movement. This history is by no means all-inclusive but is intended as a handy reference for use in environmental studies.

The first 125 years of American history witnessed a rapid settling of the land. Until the closing of the frontier around 1890, government policy remained one of allowing citizens full use of all resources, since there was obviously more than enough to go around. "Philosophic concepts of harmony with nature or of ecological balance found no place in the minds of frontiersmen, to whom nature was an enemy to be subdued" (Caldwell, 1973).

During this mad rush to develop the nation's resources, a few solitary voices, most notably George Marsh in Man and Nature (1864), began to express concern over heedless exploitation of natural resources. Famous thinkers and writers, like Henry David Thoreau and John Muir, helped popularize such concerns and, ultimately, shape public opinion and political action. This conservation philosophy gathered strength and powerful advocates, one of whom was Theodore Roosevelt. President Roosevelt's White House Conference of Governors in 1908 established the conservation of natural resources as an official public policy. Henceforth, resources were to be developed, utilized, and managed for "the greatest good for the greatest number over the longest time." Almost from the beginning, the new "conservation movement" was divided by controversy and inner conflict. The "preservationists" led by John Muir hoped to establish nature preserves and national parks on a nationwide basis. To some extent, they succeeded, but not on the scale they had hoped for. The "utilitarians," led by Gifford Pinchot, represented the opposing view in which forestry, wildlife management, dam building, and irrigation projects were carried out to enhance the usefulness of natural resources. This controversy is present today between wilderness groups and those who would like to see more resource development in the national parks.

Through the Depression, World War II, and the Eisenhower years, conservation took on a more utilitarian outlook. Our resources were evaluated on the basis of national defense, continued growth, and expanding technology. The responsibility for environmental control was left to the individual states, localities, and industries. The great scientific and technological advances during this same period also helped foster the belief that science will solve all problems. These are key points. A philosophy of forever expanding growth, lack of coordinated planning for the future, and blind belief in the "technological fix," together led directly to a rapid decline in environmental quality.

The early 1960's became the beginning of a new conservation movement. Rising citizen affluence, mobility, and education led to a demand for a higher

standard of living which included more popular recognition of environmental problems. Rachel Carson's Silent Spring (1962) and Stewart Udall's The Quiet Crisis (1963) were among the early writings concerning the social aspects of ecology and the diminishing quality of the environment.

The 1960's also saw a change in public policy. Congress began passing legislation directed at specific natural resource problems such as the Clean Air Act of 1963 and the Clean Water Act of 1965. A linking of conservation, outdoor recreation, and natural beauty became part of Lyndon Johnson's "Great Society," but legislative support for this policy was lacking due to domestic problems and the increasing U.S. involvement in the Vietnam War. This did not stop the many conferences, symposia, and studies which became nationally recognized and important. The concept of environmental quality was now firmly established. The combination of public awareness and pressure led to a national policy for the environment. This policy statement, sponsored by Senator Henry Jackson, became the National Environmental Policy Act of 1969. NEPA established a national policy to:

(1) arrest the deterioration of the environment;

(2) restore and revitalize damaged areas of our nation so that they may once again be productive of economic wealth and spiritual satisfaction;

(3) find alternatives and procedures which will minimize and prevent future hazards in the use of environment - shaping technologies, old and new; and

(4) provide direction and, if necessary, new institutions and new technologies designed to optimize man-environment relationships and to minimize future cost in the management of the environment.

The Public Planning Movement

The initiation and development of public planning closely paralleled that of the environmental movement. Although village commons and parks were established in colonial communities, these were largely a result of European influence and the common need to provide for public cattle grazing and mutual protection. During the 1800's, planning was a private concern. Natural resources, land, labor, and money were accumulated and coordinated by banks and industries to build railroads, canals, and steel mills. The early conservation movement, which included the First National Conference on Planning in 1909, was the first public attempt to plan for future resource availability.

Planning for continued economic development led to the huge federal projects of the 1920's and 30's. Reforestation, dams, government buildings, and bridges were only part of the public effort to solve such large scale crises as unemployment and natural resource conservation. The increasing federal involvement in planning led to such planning organizations as the Tennessee Valley Authority (a multipurpose, regional planning and development agency), soil

conservation districts, and water conservancy districts like the Muskingum River in Ohio. Multi-state regional planning boards and the Natural Resources Planning Board (NRPB) were also established to plan and coordinate resource use, growth, and technology. There was much opposition to this type of planning approach, and the Planning Boards were terminated during World War II.

During this same period, regional planning concepts were first being developed, though by private organizations like the Regional Planning Association of America, headed by Lewis Mumford and Benton McKay. These organizations were important in that they established a framework by which public planning agencies operate today. They advocated communities integrated with the environment and designed with basic human values in mind. Government committees of the early 1950's studied problems of resource availability and increasing population and their effects on economic development and the environment.

The Federal Housing Act of 1954 established state and local comprehensive planning based on increasing problems brought about by rapid urbanization. In 1965 and 1966, the planning areas were broken up into regional planning commissions which could better deal with regional issues like pollution, land use, and economic development. They were also a logical location from which federal funds could be distributed to solve regional problems. With the growing interest in environmental issues, regional planning has become more important.

Regional Environmental Planning is a process and philosophy which derives its form and function from the meanings of each of its root words--region, environment, and planning. In order to understand the intent, implications, and importance of regional environmental planning, each of the root words will be examined individually.

Regions

People identify with regions. When a stranger is asked where he is from, the most common reply will be a regional name such as New England, the Pacific Northwest, the South, or even the Red River Valley. Webster defines a region as ... "any more or less extensive, continuous part of a surface or space." Regions usually cover large land areas which are somewhat different in appearance from surrounding areas, such as a mountainous region set apart by lowlands. A region could also be an administrative area, division, or district, like the Tennessee Valley Authority. Regions may be either natural or cultural.

Natural regions are usually defined by a unique physical or biological feature. The following table gives examples of natural regions:

Geographic Regions	Mountains, plains, sea coast
Climatic Regions	Temperate, arid, moist, monsoon
Hydrographic Regions	Seas, lakes, rivers
Geologic Regions	Volcanic, depositional, basin and range
Biogeographic Regions	Tundra, tropical, taiga, prairie

Each type of natural region has been described and studied extensively; there is even some argument for dividing countries and states according to selected natural boundaries such as mountain systems or watersheds.

Cultural regions are shaped and influenced by people. Below are examples of cultural regions:

Political Groups of Nations	European Common Market, Middle East, the Orient, Latin America
Multi-state Regions and Associated Regional Organizations	Rocky Mountain States, Mid-West, Prairie States Tennessee Valley Authority, Delaware River Basin Commission, Great Lakes Basin Commission
Substate Regions	Regional planning commissions, metropolitan councils of government
Human Settlement Regions	Agricultural, urban, demographic, ethnic
Resource Regions	Coal, oil, forests, soils, river basins; energy-producing or -consuming regions
Amenity Regions	"Sun-Belt" States

Cultural regions (excluding the natural resources aspect) rarely coincide with natural regions. Throughout history, this has been a source of conflict and a headache to planners. The unequal endowment of natural resources has led to expansionism, border conflict, and wars; cities are built on floodplains or valuable farmlands; or waste materials cross political boundaries and affect adjoining communities.

The Environment

When speaking of regional environmental planning, "environment" has a very broad definition; it is what we perceive as our world. It includes the physical objects surrounding us as well as those forces which influence our lives. A science-oriented definition of the natural environment would be the complex of abiotic or non-living (soil, water, climate, etc.) and biotic or living (plants, animals, people, etc.) factors which act upon an organism or an ecological community and ultimately determine its form and survival. We often think of the natural environment as a school or a farm woodlot where classes in nature interpretation or biology are conducted, or as the state and national parks we visit during our vacations. But, the natural environment also includes all those areas of our world not specifically built upon by man which can support even the smallest ecosystems. Thus, many natural relationships between living things and their environment can be illustrated and studied along street sides, in school yards, and other places close to human structures.

Human-built or artificial structures comprise another part of our environment. This part includes physical objects such as our houses and other buildings, our streets and highways, our vehicles, our communications devices, appliances, and all the other things we have put together by hand. We collect natural resources, both living and non-living, and transform them into usable objects

to make our living more efficient and enjoyable.

Another part of the environment is the collection of all social and cultural forces which influence our lives and our community. This definition is often used in the social sciences. The social and cultural environment is important in shaping human (or artificial, i.e., man-made) systems. Since people have developed the ability to superimpose their systems on natural systems or to manage natural systems for their benefit, they have brought change to the environment. In turn, individuals and communities have been affected, sometimes with less-than-desirable results.

Planning

Planning is the conscious direction of effort toward the attainment of a rationally desirable goal (Barlowe, 1972). An explantion of planning is presented through a question-and-answer format below.

Who Plans?

The ability to reason and plan ahead is a human attribute. All of us plan our daily work, our vacations, our interpersonal relationships, and our houses and structures. Businessmen and corporate executives plan their capital investments or new products in anticipation of success in the marketplace. Military leaders plan for the defense of their country. Government officials plan for the welfare of their citizenry. Towns and cities are planned by their leaders to ensure that the community is an attractive and pleasant place to live with a sound economic base.

Why Plan?

Public and private planning play a necessary role in society. Originally, planning was used as a simple process to make the daily lives of individuals, families, and small groups easier and more enjoyable. In early human history, hunting expeditions were planned and coordinated to obtain enough food for the entire tribe; crops and migrations probably were planned also. It was important to human survival to use resources in the most effective ways and to avoid mistakes. As society grew more organized and complex, planning became a tool for leadership and management and, eventually, an indispensable part of all institutions. There is an increasing need for overall planning and coordination if people are to work together. Gillie (1967) states that "planning is an attempt to work out . . . the concepts of constructive, far-sighted management. . . to seek out obstacles to progress and try to devise ways of overcoming them with emphasis on the future, lives, and growth."

Thus, a highway can be built to do the most good (get people safely and efficiently from one place to another), cost the least economically and environmentally, be the most attractive, and use up the least amount of valuable land.

When is Planning Necessary?

Private planning, as when an individual plans his daily activities or when a business plans its new products, is both necessary and desirable. Regional environmental planning, on the other hand, is a form of public planning, or planning which is done by a few representatives in the name of the general public. There are wide differences of opinion with respect to the necessity and desirability of public planning. Proponents for planning argue that, in a representative form of government, many people have to depend on the activities and decisions of only a few individuals to provide for the health, safety and welfare of all of society. This dependence on others has intensified conflicts of interest which would be disruptive without planned group action to designate and enforce minimum rules. Those objecting to organized planning express a fear that planning will lead to overregulation, collectivism, and too much government. It must be noted, however, that public planning in the United States gained its impetus in reaction to the laissez faire philosophy ("the government which governs best, governs least") practiced by the government in the late 1800's. The demand for public action to curb social abuse and economic exploitation led to new social controls, and planning has played an important role in carrying this out. The need for public action has also been shown in curbing environmental destruction. Pollution control and resource conservation would never have been accomplished without public awareness and action.

A development of valid planning objectives is necessary to make the process acceptable. These objectives include:

(a) promoting orderly and optimum development of human and natural resources,

(b) minimizing certain problems and conflicts associated with private activities, and

(c) maximizing social welfare.

Whether planning will mean more or less freedom for the individual always depends upon the objectives and techniques of the planning process, the people who devise and administer the plan, and the individual's definition of freedom (Barlowe, 1972). It also depends on the level of involvement. If a few people are involved in the planning process, the needs and interests of the rest may only partially be met. If larger numbers of people take an active part in planning, the outcome is more likely to be acceptable to a larger proportion of those affected.

What is the Planning Process and How Does it Work?

The planning process consists of three general steps:

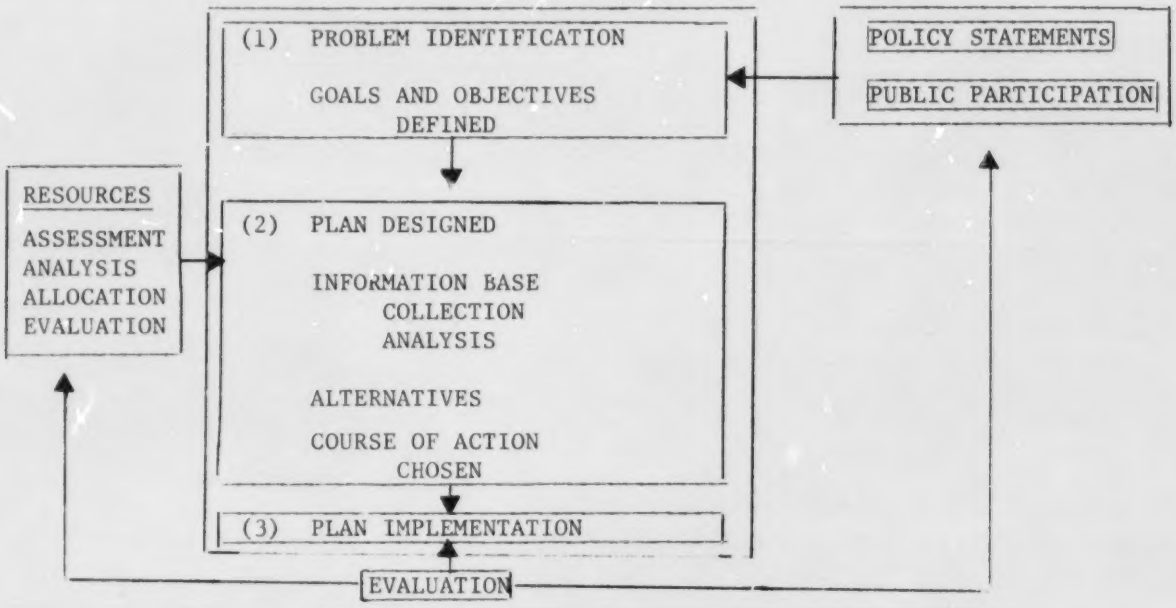
(1) formulating goals and objectives,

(2) designing the plan itself, and

(3) putting the plan into action.

Each step in the planning process is illustrated in the model below and explained briefly in the following text:

THE PLANNING PROCESS



The assumption and determination of goals and objectives gives direction to the planning process-- i.e., "planning for what?" A problem or situation exists which requires a certain amount of organized effort: a larger highway must be built to accommodate anticipated traffic, a new sewage treatment plant is needed to service future population growth, or a different educational approach should be implemented to deal with changing issues or attitudes concerning recycling. Planning goals and objectives can be modified either by official policy statements or by direct citizen input. Policy statements are usually compiled by the political institution while it represents the population as a whole. Planning based on public policy tends to be more organized and sequential (i.e., there are several problem areas, let's deal with them according to our community's objectives and funding; when one problem is solved, we will tackle another). A public policy statement is important in forming a comprehensive, or all-inclusive, regional plan.

Direct citizen input is valuable to the planning process in that it sometimes reveals objectives which may have been overlooked by representative decision makers. Citizen groups who are aware of unique situations or specific neighborhood problems can have their interests added to the list of problems to be solved. The necessity of citizen participation in planning cannot be overstressed.

The first step in formulating a plan requires gathering as much information as possible, including both advantages and disadvantages. Research and study concerning the nature of the problem situation is necessary. It is at this stage of planning that the needed resources are analyzed and evaluated. Such resources could include funding for new projects, manpower, or materials. Once each resource's quality and quantity is assessed, it is allocated according to the goals and objectives of the plan. The various combinations of goals and resources present a series of alternative solutions to the planner and decision maker. Each alternative is analyzed for its legality; constitutionality; and its economic, social, political, and environmental acceptability. For example, a region may have a river which floods every year causing economic damage and threats to safety. The region's decision makers are faced with several alternatives: they could install flood control projects like dams or levees in hopes that such solutions will be long-term and sufficient; they could offer low-cost flood insurance and maintain the status quo; or they could place a moratorium on building in the floodplain and offer incentives for people to relocate elsewhere. Each choice has its unique planning implications, expenses, and trade-offs. Therefore, it is important to have a sufficient information base in a plan to allow adequate evaluation of each alternative.

The alternatives are usually listed in a series of preliminary plans. The formal plan is drafted after the choice of alternatives (including the decision to do nothing) or combination of alternatives is made. Once drafted, the plan must be put into action where it proves itself, shows a need for reformulation or revision, or fails.

A final, and essential, part of the planning process involves evaluation. Evaluation occurs at each stage of planning. Resources are evaluated to determine if they are sufficient to meet the needs and objectives of the plan. Policies, goals, and objectives are evaluated to see if they reflect community desires and sufficiently address problem areas. The plan is evaluated at each step of its formulation, and finally, the implemented plan is evaluated on its effectiveness in getting the job done.

What Makes a Plan Successful and Acceptable?

Some plans are successful and popular and become an integral part in the workings of a community or public agency. Others sit on a shelf and gather dust. There are many reasons for the acceptability of a plan; the more important reasons include the following:

(a) a sound and reasonable proposal,

(b) capable administrators who support the proposal,

(c) the cooperation of officials in other agencies and levels of government,

(d) popular interest in the plan and its results, and

(e) continued political and public financial support (Barlowe, 1972).

Another important reason for planning success involves who makes the decisions. Planning officials or consultants, while experts in their profession, usually make recommendations only; their plans may carry no popular or political support and thus, have no authority or requirement for acceptance. On the other hand, when planning is done within a legislative framework, officials responsible for accepting and implementing the plan can consider various alternatives and the advantages and disadvantages of each. When the choice is left to legislative bodies, adopted goals and plans can be made to fit the political situation.

What Are We Planning For?

Now that we are familiar with the purposes and processes of planning, it is helpful to stop and ask ourselves what we are planning for. Obviously, we are planning for the future in some way. We have identified problems and needs which require a coordinated use of physical and human resources. As a planning goal, we seek to derive benefits from solving our problems. We may wish, however, to realize those benefits either immediately or over a long term. This may involve a series of trade-offs. Planning for immediate needs may require an accelerated use of resources, possibly causing a future shortage of some of them. If resources are used in a selfish way, there is some concern for the well-being of future generations. However, if solving immediate needs will also prevent future problems, the early use of resources is certainly justified.

If we choose to plan for long-term benefits, we may have to adopt a conservation attitude toward our resources. There are probably more problems involved with planning for long-term goals than for short-term ones. Planning for benefits which will occur some time in the future almost requires the ability to predict the future. Planners attempt to do this by studying present trends and assuming that future ones will be similar. Human nature, however, is difficult to predict. Past and present generations may feel that future generations can take care of themselves. We seem to be using our fossil fuels with this attitude. It is also difficult for people to visualize future needs when their present problems seem overwhelming.

Fortunately, society in general has come to accept a stewardship role of long-term environmental and natural resource protection. In this, some resources have been set aside for future generations while others are, hopefully, being used as slowly and efficiently as possible. Today, we are enjoying resources which were provided by the foresight of our past leaders. We, therefore, have a similar obligation to those who follow us. Planners will play an increasingly important role in this process.

Regional Planning

Once familiar with the three "root words" of Regional Environmental Planning, we can begin to arrange them by different combinations such as regional planning, environmental planning, and, ultimately, regional environmental planning. It must be recognized that, as often, the whole is more than the sum of the parts.

Understanding regional planning requires a knowledge of the concept of regionalism. Because many of the planning problems experienced by communities

are becoming more complex, a regional consciousness is often necessary to solve these problems. Saarinen (1976) defines regional consciousness (or regionalism) as an awareness of the uniqueness of an area involving a feeling of belonging or a sense of shared existence formed among inhabitants of the region. He further sets the stage for an environmental regionalism by stating that a change occurs in a shifting emphasis from the built and social environments to perceptions and behavior in relation to the natural environment. Since the major regional problems of land use, pollution, transportation, waste disposal, and growing urbanization impact the environment and quality of life as never before, this concept of regionalism is vital in understanding these problems and solving them on a regional basis through collective action.

Planning on a regional scale has certain advantages over planning at higher levels (state, multistate, federal) and lower levels (local, township, or county). Information and resources not available to individual communities (financial, legal, administrative) can be placed in a central location to assist all. Regional planning is comprehensible and participatory. Its organizational level is not too large to understand, while still small enough to allow more citizen interaction than higher planning levels. Finally, various resource disciplines such as land use and watershed planning can easily be integrated at this level.

Farness (1966) recognizes several socioenvironmental planning categories which can be implemented on a regional scale. These cover many different kinds of human purposes and geographic areas:

(1) Resource Planning for "Economic Development" - Programs for the development and conversion of water, land, forests, minerals, scientific, and historic artifacts into marketable goods and services. A vast range of public and private ventures is included in this category.

(2) Urban Regional Planning for "Urban Habitat" - Programs for urban living space for metropolitan areas, urbanized counties and urban regions.

(3) Regional Facility Planning for "Techno-economic Efficiency" - Specialized programs for large systems of facilities such as highways, airports, and water supply and utilities.

(4) Ecological Planning for "Biological Fitness and Health" - Programs for public health, air and water pollution control, soil conservation and wildlife propagation and reforestation.

(5) Social Institution Planning for "Implementation" - Programs, usually joined to other types of planning, for new legal and institutional forms required to carry out plans. At regional levels, such planning is seldom explicitly conceived as "institutional building".

Environmental Planning

The basic premise of environmental planning is that man is part of his environment and dependent on it for survival. Through applications of technology, man can alter his environment to suit his needs. But not all changes, however rationalized, have resulted in establishing a better world.

The environmental movement, described earlier in this section, has brought about an increasing awareness in the workings of natural (and cultural) systems and how they can be impacted by human alterations. As a result, a large percentage of this country's population is beginning to question people's rights to continue their irresponsible use of the world's resources. With the passage of environmental laws, such as the National Environmental Policy Act of 1969 (NEPA), the Clean Air Act (1970), the Water Pollution Control Act (1972) and other legislation, problems were recognized to be of nationwide importance, requiring massive efforts on the part of governmental agencies and businesses, along with significant changes in the way people use resources. The planning process began to include environmental matters as a major focal point in establishing and implementing plans.

Environmental planning is an important tool for survival in that it considers both natural and human environments and assists in the assessment of impacts caused by both public and private actions on the environment. Terms such as "ecosystem" and "ecosystem management", "environmental quality", "natural and artificial carrying capacity" (the ability of an environment to sustain an optimal population), "ecological inventory", and "environmental impact statement", have found their way into proposed plans.

Principles of environmental planning include:

(a) preventing irreversible environmental changes,

(b) assuring human survival and progressive improvements in the quality of life, and

(c) directing human processes as parts of evolving nature as opposed to intrusions upon it. (Garlauskas, 1975).

It is the intent of environmental planners to design and build structures (such as houses, roads, bridges, etc.) which are compatible with the natural environment. To do this, planners must learn all they can about the complexities found in nature and in society. This is not an easy task. We are just beginning to unlock the secrets of nature and understand something of the intricate interdependencies found in nature. It is essential for the environmental planner to understand as much as he can about natural processes before he manipulates them to suit human needs and desires. The environmental planner should also assist in the development of our laws, education systems, economy, and politics to reflect a basic concern for the environment.

Regional Environmental Planning

The change in attitude brought about by environmental awareness has resulted in a new philosophy and a new way of viewing people's relationship with the environment. The process of regional environmental planning is a conceptual

combination of regionalism, environmental constraints and principles, and planning. It is also a combination of the recent formulation of environmental planning with the experience and practicality of regional planning.

Issues which naturally fall within the realm of regional environmental planning include transportation systems, waste disposal and recycling, water supply, land use, air and water quality, and pollution control. These planning areas are of regional importance because (1) they present problems beyond the legal authority, financial ability, territorial jurisdiction, and staff expertise of local governments, and (2) they require a level of governmental activity readily accessible and more sensitive to local interests than state or higher levels. The officials on regional planning commissions are usually local people who have local interests and loyalties and who can act as spokespersons for individual citizens in local and regional matters much more readily than many other elected officials.

In addition, the issues faced at the regional level are of vital environmental importance; each problem area mentioned above presents impacts felt directly by individual citizens. Thus, these individuals have a direct access to a process designed to adequately allocate resources, alleviate environmental degradation, and enhance their quality of life on a more personal level.

Land Use as the Focal Point of Planning

The United States has two basic resources: land and people. From an economic standpoint, land is part of our national endowment and a source of much of our capital, while people provide the labor and management necessary to appropriately develop our land resources. Physically, land is an important facet of our environment by providing the basic materials for survival.

We think of land as a spatial entity: the land surface and subsurface spaces along with the space extending above the land surface. Land is characterized by its immobility, variability, and irreplaceability. This spatial concept (1) identifies particular parcels of land, (2) is the basis for property rights in land, and (3) locates the resources of land. Natural resources associated with land include air, water, soil, minerals, sunlight, vegetation, wildlife, temperature, topography, and location. These resources affect and are affected by human activities through the use (or misuse) of land resources (Timmons, 1973).

Natural land resources interact with each other in intricate ecosystems which undergo constant change (called dynamic equilibrium). Ecosystems are characterized by varying degrees of fragility and vulnerability to outside interference. People interfere with the ecosystem in satisfying their wants and needs. These interferences are accelerated by increasing population, undisciplined use of resources, and overdependence on technology.

In addition to extracting natural resources from their ecological equilibrium, man has also injected substances and changes, either inadvertently or necessarily, into the environment. For example, the use of fossil fuels like petroleum or coal has produced both wanted energy and unwanted smoke. Methods for mining fuels and minerals have also proven to be less than desirable in

many cases. If not properly planned and operated, strip mines have become a blight on the landscape, underground mines have led to health and safety hazards, and offshore oil platforms have resulted in serious oil spills. The use of water in many manufacturing processes has made our life more enjoyable and efficient, but at the expense of water quality. The use of soils to produce bountiful crops has added to water siltation and, where the soils are mismanaged, a permanent decrease in the quantity and quality of those soils.

There is a link between the use of land resources and environmental quality. In many cases (as in the examples given above), it has become necessary to provide some type of societal control over land use through planning and management. Proper land use planning is accomplished through predicting individuals' and society's needs, finding the essential resources, and choosing the best means to develop them. This process directs the choice of development technologies. Where appropriate, this could range from intensive development, like industrialization, to strict preservation. The development could originate from either a purposeful, predictable, and acceptable way.

Some individuals wish to use land and land resources for their own benefit, but this may not be the best use of the resources now or in the future. Certain uses are incompatible with each other (e.g. heavy industry and residential) while others may be compatible with some controls (e.g., recreation and agriculture). Other land uses may irreversibly limit our use options, such as building a resort on a wilderness island; the resort may be torn down in the future, but the effects of intensive use may limit the ability of the natural systems to recover and return to wilderness.

This returns to the question of private vs. public good and the choice between short-term and long-term benefits. Society, as well as individuals, has a stake in directing proper development of land because "they aren't making any more". We have the right to be concerned about land uses which limit our options. This includes pollution, wasteful use of resources, and destruction misuse of lands which will be essential in the future. Our institutions will be important in shaping land use. Political institutions direct land policy, social institutions influence our needs and desires, economic institutions allocate resources to ensure a continuing flow of goods and services over time, educational institutions help us learn how to properly use land resources, and so on.

Land Use Problems

Urbanization

Our intensive use of the land, primarily in agriculture, has allowed the formation and development of centralized industrial, commercial, and cultural urban centers. These have attracted people who had previously derived their livelihood directly from the land. Though the trend of rural to urban movement has recently shown a reversal, we have continued to shift away from our primary dependence on land. In other words, fewer farmers produce more food.

There are problems associated with our use of urban land resources, and it will take a concerted planning effort by economists, politicians, scientists, sociologists, and individual citizens to effectively deal with them. In the

cities, there is a shortage of living areas resulting from sprawl (unplanned and uncontrolled development), congestion, and inner decay. Rising costs and taxes have sometimes precluded the highest and best use of land in favor of economics. Programs designed to maximize personal wellbeing and increase the quality of life have been eliminated or compromised when adequate funding was unavailable. Population pressures, along with the economic and environmental costs of their increasing demands on land and land resources, have caused problems in the rapidly growing cities and their surrounding suburbs.

This is not to give the impression that cities are undesirable places to live. Many people are stimulated by the business and cultural activities which cities can provide. A number of environmental problems have been solved through research and practical programs conducted within an urban situation.

Suburbanization

The last thirty years have seeen an increasing move away from the centralized cities. The Federal Highway Act of 1947 stimulated massive roadbuilding outside of the cities. People began seeking a quiet, peaceful homesite far away from the noise, congestion, crime, and high taxes associated with cities. It became part of the American Dream to own a house and a piece of land.

Unfortunately, many of the city problems were simply moved to the suburbs. Transportation systems had to be improved: a rural, gravel road was no longer sufficient to carry commuters from their homes to their city jobs. Better roads meant access to greater numbers of home-seekers, and land developers were quick to construct new dwellings, including extensive subdivisions. More people demanded more sufficient essential services (schools, hospitals, fire and police protection) as well as support services (shopping and cultural centers). When such facilities were poorly planned, strip development resulted. (Strip development is a form of suburban or rural sprawl; commercial establishments are located along roads in narrow, strips. Access to property behind the strip is often eliminated, taking away some of its value. On the other hand, prices for road frontage are excessive, leading to higher taxes and land speculation.) Land was used inefficiently and often carelessly. Demand for needed facilities, including water supplies and waste disposal, also caused an increase in the taxes necessary to finance them. Rising taxes in newly urbanized rural areas often resulted in the loss of farmlands when farmers, unable to continue their operations, sold out to the highest bidder.

Uncontrolled Growth

The problems caused by urban expansion, suburbanization, and the movement back to rural areas are examples of uncontrolled growth. The spreading effects of air and water pollution and the expanding population, with its increasing demands for goods and services, have prevented individuals and single communities from finding adequate solutions. The larger cities have enough problems of their own without lending assistance to the suburban areas which surround them. Samll communities seldom have the knowledge to wade through bureaucratic obstacles to secure the necessary assistance. Single communities may not always have the legal skills or financial resources to effectively deal with polluters or the funds necessary to build their own sewage treatment plants. Also, they may not have sought the expertise to formulate an adequate zoning plan to provide for reasonable growth in their community.

Proper land use is essential in controlling growth and accommodating the effects of growth. It is necessary to understand our basic rights involving land in order to examine the possibilities of what can be done in each of the problem areas on a regional basis. This topic is examined in the following section.

Public Planning and the Changing Rights in Land

The need and desirability for increased use of public planning is based on a changing attitude toward governmental programs which affect individual rights involving land. There are several reasons cited below for this shift toward more social control of land use (Barlowe, unpublished).

(1) Increasing population with resultant pressures on land and land resources.

(2) Shrinking resource base in which the concept of inexhaustible land resources is no longer reasonable.

(3) Exponential economic growth which has called for ever-expanding quantities of raw materials when there is no longer enough to go around.

(4) Broader education which has caused citizens to be more concerned about the government's role in property rights, while demanding more from government than earlier generations did.

(5) Rising real incomes and higher levels of living; increasing productivity has lead to higher incomes and demand for more goods and services. This has caused a demand for public policies to ensure our continued affluence.

(6) Wider suffrage; with more people having access to the governmental process, there is the opportunity to seek and provide public services to a wider range of special interests.

(7) Environmental concerns which resulted from all of the preceding reasons and will have a continuing impact on all future public policies concerning land use and property rights.

It has been argued that public planning represents a loss of property rights, or ". . . no one can tell me what I can do with my land!" This feeling springs from a subconscious belief that property ownership is a sacred and inviolate right, or that it is a natural law. In truth, property rights depend on the societies in which we live; rights are real only when a sovereign power recognizes them and is willing to defend them (Barlowe, unpublished).

Property rights involve rights with respect to material objects. Conditions necessary for the existence of property (and rights therein) include (a) physical land or objects that can be held, (b) identified owners and those excluded, and (c) a government which will protect property rights. It involves exclusive (not absolute) rights, and the most rights in property ownership involve fee simple ownership. Exclusive rights gives the owner the ability to

use property to the exclusion of others, within limits set by the sovereign power. Absolute rights would give the property owner complete authority over his property without any legal or constitutional restraint. Fee simple gives an individual property owner the right to sell, lease, mortgage, subdivide, or grant easements with respect to his property. Rights reserved to society include taxation, public ownership, eminent domain (to take private property for public use), police power, and escheat (to take property when one dies without a will or heirs).

In the past, individual property rights have been given up to society without a loss in property values. Easements for sewer, water, or electricity involve giving up property but have increased the value of the property to the owner. Certain social needs have been met through such exchanges in property rights. Zoning provides owners with security in their expectations concerning the use of neighboring properties.

With a rising acceptance of a stewardship or public trust view concerning land resources and property rights, it becomes necessary to develop responsible public programs, including planning. While it is obvious that the rights of some individuals to exploit land resources to the detriment of the environment and other people must be limited, we must be careful that the loss of any right is truly in the public interest and will result in long-term benefits. Adjustments in property rights must be carefully examined so that they will reflect rational thought and concern for our present and future well-being.

Topics Pertinent to Regional Environmental Planning

Planning topics such as land use, transportation, waste disposal, recycling, pollution control, and water supply have been mentioned earlier as issues which can be best handled on a regional level. To reiterate, there are four reasons for this:

(1) Each problem is broad in scope. That is what one community chooses to do about land use or transportation, for example, will influence other communities' options.

(2) Each problem area is extremely complex, requiring the communication, cooperation, and coordination of many levels of government decision makers, planning experts, and people.

(3) Each problem area will be expensive, both in terms of investment and in personal sacrifice; the costs will be less if shared by larger numbers of people (on the other hand, the costs of not doing anything may be insurmountable in the future).

(4) Each problem area has environmental implications - if planned, designed, and implemented improperly, the problem solutions can adversely affect both natural and human environments on a large, regional scale.

Because of the inherent difficulties and complexities of regional problems, they can be interpreted differently by different people, often making them open to misinterpretation and conflict. The problem areas exist in nearly every region, and, unless proper solutions are found, they will not go away. Moreover, when inappropriate choices are made, people who live in the region are often "stuck" without the option of changing the solution because their money has been spent unwisely on a poor solution to a problem. Therefore, dealing with regional problem areas will require a thorough understanding by all people affected by decisions.

The remainder of this section examines the informational content of each regional environmental planning topic divided into five subsections to give teachers, curriculum planners, and instructional designers a source of material in a format which will help them develop teaching units on each topic. These subsections include:

(1) a general description of the problem area,

(2) its regional character,

(3) specific federal legislation (in many cases, states have also passed more stringent legislation dealing with these topics),

(4) examples of actions already taken, and

(5) a sampling of questions to be asked concerning the the status of individual communities.

Transportation

Problem Description: Nearly everyone who drives to work knows that there is a traffic problem. Likewise, a quick check at any service station shows that gas prices are continuing to rise. Railways and bus lines are continually faced with financial troubles. Widespread systems of mass transit have not really progressed beyond the planning stage. Major problems foreseen deal with energy, air pollution, citizen attitude toward mass transit (which seems to be the major obstacle), and inconvenience (some isolated areas or special interests like church routes will be difficult to serve). As the cost of owning and operating private cars continues to increase, there will be more pressure on and acceptance for developing regional transportation systems. Much depends on changes in people's lifesytles and in improving efficiency of mass transit systems. Many areas have traffic problems that rapid transit alone cannot alleviate. These will require new or updated highways which can only be planned effectively on a regional basis.

We need to give greater attention to linking transportation systems. For example, a few years ago, a sign in Cleveland boasted that only two cities in the world had rapid transits linking their airports and downtown: the cities were Cleveland and Tokyo. This lack of linkage between bus, air,

rail, and automotive transit is a problem requiring regional as well as state and federal cooperation. Alternate forms of transportation, most notably the bicycle should be included in regional transportation linkages. The lack of safe and adequate bicycle lanes within and between communities represents a planning problem requiring more emphasis.

Regional Character: The costs and complexities of planning, designing, and implementing adequately linked transportation systems have precluded local efforts. Transportation modes such as buses, commuter trains, bike paths, and so on must be continuous between communities to be worthwhile simply because people often live, work, and shop in different communities. By pooling the resources of many communities and transportation authorities, mass transit and private transportation can be more efficient and economical, as well as environmentally acceptable.

Federal Legislation: Funding for transportation plans is authorized through two federal acts, the Highway Act of 1962 (Section 134) and the Urban Mass Transit Act of 1964 (1970 Amendment).

(Note: copies of individual laws and proposed legislation can be obtained by writing to state and federal representatives, government printing offices or legislative service bureaus, or in the documents section of the library).

Implemented and Proposed Actions: Numerous transportation proposals have been made and implemented but are relatively limited. Rapid transit, such as BART (Bay Area Rapid Transit) in San Francisco, was designed to relieve commuter pressure from area freeways. Other regions are considering the feasibility of similar systems, but are faced with extremely high costs and questionable ridership potential. Other cities, like Chicago, offer both a rapid transit system and a combination bus-car pool lane. This innovation reserves a freeway traffic lane for the exclusive use of buses and authorized car pools. Some states are providing free parking areas adjoining freeway entrance ramps for car pool participants.

Other examples of transportation planning include making existing bus lines, subways, and commuter trains more efficient. Dial-a-Ride has been successful in several suburban areas. Some cities have even looked into the possibility of reviving subway and trolley lines. Dr. Barry Commoner, in The Poverty of Power (1977), has made a strong case for developing electric rail systems as a cheap and efficient method for mass transit. He feels that regions and municipalities should generate electric power to run the trains while using the waste heat as energy to cool and heat homes and businesses.

Questions to Think About:

1. What forms of transportation are available in your community? in your region? How do these link with each other?

2. Based on your own experience and what you have read in newspapers, magazines, or seen on television, etc., do you consider the transportation systems in your area sufficient? Why do you think so?

3. If your answer to (2) is negative, what modes of transportation require change? How could these be changed to make the transportation systems cost-effective, energy efficient, and attractive to people?

4. What changes have been proposed in your community, region, etc., to deal with transportation problems? How will these affect your community and adjacent communities?

5. If mass transit systems were cheap, efficient, and convenient, would you use them? How would you try to convince your students to use them?

6. How can bicycles be used as safe, low-cost transportation? Are bike paths available? How could they be acquired or improved?

Air and Water Pollution Control

Problem Description: At one time, when our country was less populous, there were fewer social requirements for dumping what we didn't want or need. Usually, we got rid of wastes in the environment. We dug holes to bury our solid wastes, we let oceans and rivers carry our liquid wastes away, and we used air currents to carry off our gaseous wastes. In many places, we are now generating more wastes than the environment can handle. While great strides have been made in cleaning up air and water pollution, we still have a long way to go, especially with toxic substances, such as lead, carbon monoxide, and numerous chemical wastes from manufacturing processes and agriculture.

Due to problems of traffic, industry, and climate, some of our major cities and their surrounding regions have hazardous air quality at least half of the year. Other areas are more fortunate, but much clean-up remains to be done. Secondary waste water treatment has improved water quality dramatically in the last decade, even though sewage treatment plants which boast 95% efficiency are still releasing enough nutrients to cause pollution of lake and streams.

Regional Character: Because of the widespread effects of air and water pollution, regional organizations are a logical level for pollution control programs to have the most effect. Identifying and restraining polluters has also been promoted in several states through cooperative interactions among citizen groups, governments, and planning agencies.

Sewage treatment has been proposed on a regional basis. With individual communities growing at faster rates, existing treatment plants are quickly becoming obsolete. In addition, the costs of more adequate processes strain community budgets. Regional treatment facilities, offering more efficient and expensive processes, can be built.

Pollution Control Legislation: (1) Air Quality: Air Quality Act of 1967, Clean Air Act (Air Pollution, Prevention, and Control), 1970 Amendments. (2) Water Quality: Federal Water Pollution Control Act of 1948, 1972; Water Quality Improvement Act (1970); National Estuary Protection Act (1968); Clean Water Restoration Act (1966); and Clean Water Act (1965).

Implemented and Proposed Actions: In many areas, air pollution has been drastically reduced through legislation, citizen action, and economic pressure. Pollution control devices installed in vehicles and industry are seen to be the most important technological weapons against air pollution. Air quality can improve only if people and industries are conscientious about maintaining their machinery for maximum efficiency with minimum emissions.

Water quality has improved to the point where once-polluted lakes and streams can, again, sustain aquatic life and be utilized for recreation. Much of this improvement has been accomplished through the adoption of more adequate sewage treatment facilities by most municipalities and industries. More advanced treatment facilities have been successful at Lake Tahoe. Additional improvements in water quality have been sought by Section 208 of the Water Pollution Control Act of 1972 which proposes a national goal of clean water by 1983. Each municipality, region, and state is required to submit a plan outlining its efforts toward achieving the goal. Regional commissions have the responsibility to sample and monitor water supplies, report violations, set area wide standards, and review and update their plans. Proposed activities include elimination of phosphate detergents, reduction of lawn fertilizers, cleaning storm sewers, controlling toxic substances, and developing more sophisticated sewage treatment processes. Other forms of technology, such as spray irrigation of secondary effluent or groundwater recharge, have been proposed. These involve using treated sewage in biologically harmless and economically advantageous ways.

Questions to Think About:

1. What is the status of air and water quality in your community? in your region? How is it monitored? Where are the monitoring stations located?

2. Have air and water quality improved over the last 10 years? 5 years? 1 year?

3. Can you list any specific air or water problems (i.e. industries, businesses, private individuals) which still exist in your area?

4. Is there an adequate information and clean-up program dealing with air pollution, water pollution, and toxic substances in your area?

Solid Waste Disposal and Recycling

Problem Description: We are generating more solid wastes than our present systems can handle. The sanitary landfills used by many municipalities are rapidly reaching capacity, and suitable land for new landfills is becoming more scarce, expensive, and remote from population centers. Some communities have resorted to annexation in an attempt to locate new landfills. Much of this waste can and should be recycled, but there remain financial barriers and public reluctance to re-use something which has been thrown away. Also, people fear that harmful substances will contaminate our surface and ground water, soil, atmosphere, and food animals.

Regional Character: Solid wastes have been disposed of on a regional basis for many years: an urban area either annexed or purchased a parcel of vacant land and started a landfill. Other municipalities would then seek the right to dump their wastes in the same landfill. This process was sufficient as long as there was plenty of space available and it remained environmentally acceptable. With increasing population pressure, suitable landfill sites are becoming more scarce as well as more objectionable to those living in the vicinity. Further, the rising cost of land made residential use more profitable to a land developer than a landfill.

Federal Legislation: Solid Waste Disposal Act (1966); Resource Conservation and Recovery Act (1966); Resource Recovery Act (1970).

Implemented and Proposed Actions: Several areas around the country have implemented innovative methods for disposing of solid wastes. New Orleans and St. Louis burn solid wastes and generate a portion of their electricity needs; Milwaukee bags dried sewage sludge and sells it as fertilizer; the U.S. Naval Station at Norfolk, Virginia, uses an incinerator to produce steam; and Houston has been developing a composting system. Proposals for future solid waste disposal often include more intensive recycling, such as the German milling process. Milling or shredding requires several stages at which recoverable materials are extracted. Final residues are used in land reclamation. St. Louis has been experimenting with similar systems. New methods are expensive and will require a joint regional effort. Research on environmentally hazardous materials resulting from solid wastes will also require money beyond that which local governments or industries are willing to provide.

Questions to Think About:

1. How does your community handle solid wastes?

2. Does your community have provisions for waste recycling? If so, what materials (aluminum, scrap iron, newspaper, etc.) are recycled? What percentage of the population participates?

3. Are current methods of waste disposal adequate for the next year? 5 years? 10 years? In your community?

4. What disposal methods are being considered for the future?

5. Does your community share a common landfill with other communities in the region? How is it governed?

Water Use and Supply

Problem Description: Water is one of our most abundant resources, but we do have a shortage of quality water for human needs. People use water in many ways beyond the simple household uses. Vast quantities are needed for irrigation, food processing, manufacturing, industrial processes, and power generation. Though water supplies are ample, there are three factors which lead to a nationwide (and worldwide) shortage: very unequal distribution, rapidly rising demand, and increasing water pollution near urban centers. In most of the Southwest and in many urban regions of the country, we are withdrawing water from underground supplies faster than it is being replaced by rainfall. This problem is not becoming any less acute when structures like roads, parking lots, or buildings are built over recharge areas. For communities receiving their water supplies from surface sources, any decrease in water quality due to nutrients or toxic substances means a more expensive treatment process before the water is fit for human consumption.

Regional Character: Water supply systems have been planned successfully on a regional basis for many years. The widespread character of water resources (lakes, watersheds and underground sources) has made it easy for many communities to share in its development. The costs of building dams, reservoirs, pump-storage facilities, and treatment plants are large enough to justify sharing these costs. If our demand for water continues to rise, regional development of water supply systems will also increase.

Water System Legislation: Water Quality Improvement Act (1970), Clean Water Restoration Act (1966), Water Resources Planning Act (1965), and Saline Water Conservation Act (1961).

Implemented and Proposed Actions: Dams and reservoirs are being used to ensure a supply of water for many areas of the country, especially in the South and Southwest. Many urban areas are using surface water from lakes and rivers if it is of sufficient quality. Most of rural America is using groundwater from wells.

There have been many proposals for getting sufficient water to more people. These methods aim to either tap new sources, divert water from one area to another, get people to move to areas with more water, or better care of our present sources. For example, water for the City of Los Angeles and for irrigating California crops is currently being diverted from the Colorado River and the Mt. Shasta watersheds.

Many manufacturers are recycling the water they use by installing treatment plants and cooling towers. Other proposals have included increased desalination, weather control, and even towing icebergs.

Projecting future water needs is difficult for planning agencies because estimated future populations may or may not require the same amounts of water we use today. Another source of difficulty is in industrial water use. New technologies need to be developed which require less water, are designed to recycle their water, or to get by with using lower quality water. Designation and protection of recharge areas will require strong legislation and regulation to prevent loss of vast quantities of water to runoff and to ensure groundwater quantity and quality. Providing water supplies from a regional distribution point and adequate conservation may both go a long way toward equitable water supply and distribution.

Questions to Think About:

1. Where and/or by what method does your community get its water? Is this a regional facility, i.e. do other communities share the costs and water?

2. Who are the large users of water in your community or region? For what purpose do they use water? Is it feasible for them to use water more efficiently through recycling, etc.?

3. Are your region's water supplies sufficient for the next 5 years? 10 years? 25 years? longer?

4. Has your community or region been studying the feasibility of implementing a new water supply system such as desalination or diversion in place of present systems?

5. What methods have been employed to induce people to conserve water in your area? Have these methods been successful?

Implementation of Regional Environmental Planning: Regional Associations and Councils

Regional associations and councils are voluntary areawide organizations which involve cities, counties, towns, and often, school districts within a total community. Their prime purpose is to increase communication, cooperation, and coordination among local governments in planning and implementing programs to meet mutual problems (National Service to Regional Councils, 1971).

Substate regional planning organizations within a particular region were developed in response to the growing need for an agency which could deal with a wide range of issues beyond the level and abilities of an individual community. Problems which are no longer confined to local jurisdictional boundaries or are too expensive for limited local budgets become regional

problems. Subjects of regional consideration have included air pollution control, solid waste disposal, water supply and quality, land use and settlement, transportation, law enforcement, manpower, and economic development. These topics have implications in both the natural and human environments.

Individual communities have attempted to confront these issues independently, but this has led to a duplication of efforts, lack of coordination, and unproductive competition. Regional planning organizations have avoided this by formulating an all-inclusive or comprehensive plan for the region. They provide a forum for communication among local governments and promote intergovernmental coordination of efforts through technical assistance, review, and mutual cooperation. Regional planning organizations operate through a planning and decision making process where area problems are identified, data are collected, and plans of action are identified, all from a central planning agency. Implementation of plans requires the cooperation of local governments which comprise the region.

Enabling Legislation

Planning organizations were first implemented and funded through Section 701 of the Housing Act of 1954. Their purpose was to solve urban planning problems, facilitate comprehensive planning in state and local government, and encourage the establishment of planning staffs. The states did not identify regions for planning purposes until the middle 1960's. This movement toward regional organizations was further encouraged by Section 204 of the Demonstration Cities and Metropolitan Development Act of 1968. The review function of regional organizations, known as A-95, appeared in Section 401E of the Intergovernmental Cooperation Act of 1968.

Comprehensive Planning Function

The early emphasis of regional planning organizations was in the development of a comprehensive plan. A comprehensive plan is traditionally defined as an official public document adopted by a local government as a policy guide to decisions about the physical development of that community. The essential characteristics cited are that the plan be (1) comprehensive, encompassing all geographic parts of the community and all functional elements which bear on physical development and (2) general, summarizing policies and proposals, not beyond current issues to the perspective of problems and possibilities 20 to 30 years in the future. In recent years, comprehensive planning has broadened to also include human resources and social planning, along with traditional physical planning (Goodman, 1968).

Review Function

The A-95 Review Process is a method used by designated regional planning organizations to promote coordinated planning and information exchange on an intergovernmental basis. The review process applies when a governmental agency or other organization makes an application for federal assistance under certain programs. It provides an opportunity for state, regional, and local organizations to review and comment on proposed projects which may

affect their plans and programs. Comments from reviewing agencies are strictly advisory and have no direct bearing on whether or not the project gets funding.

The regional organization which has been designated as the A-95 review agency acts as an information clearinghouse by compiling comments pertaining to projects. Suggested subject areas for comments include project compatibility with present comprehensive plans, objectives, and priorities; needs for revision or better coordination; effects on the environment, energy resources, people, businesses, or other resources; and contributions to uniform growth patterns.

Problems Confronting Regional Planning Organizations

Regional planning organizations have a responsibility to local governments in assisting them through information gathering, identification of problem areas, and drafting plans to solve the problems. However, the plans they formulate carry recommendations rather than authority; they have no power to implement decisions. Unless there is a parallel regional government (as exists in some metropolitan areas of Canada, the Netherlands, and to some extent in the State of Hawaii) or unless more power is granted to regional planning agencies by local, state or federal governments, it appears that regional planning organizations will remain advisory.

Another issue faced by regional planning organizations lies in their relations with local governments. Although only one-third of regional planning organizations' operating budgets come from local sources, such contributions may entail as much as 80 percent of a municipal budget (Shelton, unpublished). Undoubtedly, this has caused bad feelings when local officials failed to see any improvement in local conditions. On the other hand, some communities or townships lacking organized planning bodies have benefited through this arrangement. The key to solving the funding problem is accountability, or active participation by member-community representatives in the planning process. If members participate in planning and decision making and actually see that progress is being made funding can be assured.

The funding problem has also caused difficulties within the organizations themselves. Inadequate budgets have prevented organizations from hiring and keeping qualified staff personnel who can devote their time and expertise to their particular specialties. Often, a transportation planner must also plan water systems or housing. Worse, planning may be done by people who have no planning background at all (Clawson, 1973). Operating inefficiency and ineffective service have resulted.

The problem of popular support has also become a focal point in the operation of regional planning organizations. In many cases, the majority of people served by such organizations are unaware that they exist. If the people have heard the name of the organization, many perceive it as just one more government agency which has some nebulous association with their lives. This also leads to fear of increasing government control. Too few actively participate, either through contact with their local representative or by attending open meetings. Popular support is one area which can be

enhanced through the efforts of an area's school systems. Teachers can contact planning organizations for information and source materials to assist in preparing class presentations or discussions. Class trips can be made to planning meetings, and officials can be invited to address classes or assemblies on specific topics.

Regional planning organizations have also been accused of service inequity by favoring one community over another. Sometimes, this has occurred through unequal financing or representation. Many regions include a central, urban area surrounded by suburban communities and rural areas. Each of the region's parts has its own particular problems, wants, and needs. When representation favors one area (such as urban) over another, conflicts arise. Cities suffering from urban blight, congestion, and environmental degradation often place little value on rural problems. Farmers, on the other hand, feel that their requests will be consistently outvoted by the larger city representation. Area conflicts however, are not always urban vs. rural: rapidly growing suburban areas with their increasing problems have been demanding better representation on planning boards.

Conclusion

In the more than 20 years they have been operating, regional planning commissions and similar organizations have demonstrated their value to both communities and the planning process. Under their guidance, difficult and costly problems faced by many communities have been solved successfully. As new problems and needs arise, regional planning commissions will continue to provide ideas, expertise, and guidance aimed at addressing those concerns. Most importantly, planning organizations have provided a forum where professional planners, decision makers, and individual people can communicate on a functional level and effectively coordinate development within resource and environmental constraints.

III. EDUCATION AND REGIONAL ENVIRONMENTAL PLANNING

Inputs of Environmental Education

Regional environmental planning can serve as a focal point for environmental education. By using the new ideas and technologies of regional environmental planning in school curricula, environmental education can be strengthened and made more relevant. Regional environmental planning relies on input from many disciplines to achieve its most meaningful and acceptable results. Subject matter and expertise from the natural sciences, social science, economics, politics, and law (plus a generous application of practical wisdom) must be drawn together to formulate solutions to environmental problems. Environmental education, like regional environmental planning, must integrate the various subjects taught in schools. The Guide, therefore, was designed with a two-fold purpose:

(1) to improve teachers' understanding of regional environmental planning, and

(2) to aid teachers in affecting the curricula of their schools by providing an organizing theme for structuring environmental lessons, activities, courses, and programs.

The term "environmental education" often connotes a classroom filled with students learning about "ecology" or taking a field trip at a local nature center. Too often, individuals identify it as a process which protesters use to harass industries for polluting the air and water, advocate resource preservation, or stop all growth.

It cannot be denied that environmental education teaches people to be more aware of the world around them, to be sincerely concerned with environmental problems, and to seek a more harmonious relationship with their world. Environmental education is like other forms of education in that it stimulates interest or, at the very least, exposes people to a different learning perspective. It begins the process by introducing young children to the beauty and intricacy of nature. It presents a source of continued interest and study to more advanced students and provides a framework of planning and decision making which citizens can actively and intelligently take part in. Much of the heated debate, conflict, and misinformation which accompanies environmental policies or legislation is present because of the lack of adequate environmental education.

It is important to consider environmental aspects in science class because an understanding of most environmental issues requires an understanding of basic principles of science and their application. It is also necessary to comprehend basic ideas from the social sciences such as economics, government, politics, and history since most environmental issues are social as well as

scientific. Learning about the environment from this multidisciplinary framework is important in developing relevant attitudes and becoming informed citizens, consumers, and taxpayers. As students proceed through school (and after they leave formal schooling), they should be aware of problems caused by overpopulation, unnecessary consumption, littering, and from being wasteful and uncaring. A sound background in environmental awareness will remain with the student throughout his life and will make the process of planning for the future more understandable and acceptable.

Further, environmental education cannot be confined within school buildings or to people of school age. One of the most important goals of environmental education is gaining an understanding of the interrelationships between humans and their environment. Initiating environmental awareness in schools (and continuing this concept through community interaction, public relations, and the work of concerned individuals) will help further this goal. One of the important aspects of the regional environmental planning process--that of interaction between planners and those affected by planning decisions--can be facilitated by developing people who are:

(a) informed about the interrelated biophysical and sociocultural environments of which they are a part;

(b) aware of associated environmental problems and of the management alternatives useful in solving these problems; and

(c) motivated to work toward the maintenance and further development of diverse environments that are optimum for living. (Perin, 1970)

It is the obligation of environmental education to ensure that this interaction is based on understanding and cooperation. All parties affected by planning can become informed and aware of various aspects (advantages, disadvantages, alternatives) of each proposed plan.

Planning is an evolutionary process, and much of the impetus for change originates in the school systems. As new teaching methods are developed in response to growing environmental awareness, a new form of human self-development results. By studying the environment, a person begins to know himself. Planning, therefore, becomes a forum for political action in a democratic society; in effect, everyone becomes a decision maker. The development of individuals (and a populace) who are informed and concerned about human interactions with the environment is a new focus for education. People should have the knowledge of basic scientific, technological, and ecological processes along with political, social, and economic experiences as well as the desire to have a say in how those processes will affect their lives. (Farness, unpublished.)

Parallels Between Planning and Education

The planner and the teacher fill similar roles in their communities; the planner's community is the municipality, region, state, etc., and the teacher's community is the classroom, school, or community education program. The planner and the teacher can serve as opinion leaders in their communities. They have the expertise to affect change and to initiate action on various subject or problem areas. They have the information necessary to thoroughly examine the problem areas, evaluate the alternative methods of solution, and organize the plan of attack. They both utilize methods of communication, coordination, and cooperation to achieve the goals of their respective professions. Above all, planners and teachers recognize that the processes they follow are evolutionary in two senses: these processes are subject to new methods, discoveries, research, and experiences; moreover, acceptance of their ideas by the people they serve depends on the current status of the knowledge and attitudes held by those people.

Like planning, education is a communication process. In order to be effective and successful, education and planning must include a continuous exchange of information. The teacher, like the planner, must be aware of the needs, desires, and problem areas of the community. Teachers must effectively deal with these by making the students aware of the issues, informing them of what can be done from an educational standpoint, and how their coursework will change if the plan is implemented. They must also be open to changing attitudes which may modify a class or make a lesson obsolete. The planner also deals with information exchange, public opinion, and situation changes to ensure that the plans are up-to-date and that they reflect the desires of the community.

Communication with administrators is also necessary. Administrators often have a greater awareness of the overall priorities and goals of their institutions and can be of great help in developing new instructional or community plans. The teacher and planner depend on open interaction with their administrators to insure that objectives and strategies are consonant with both philosophy and resources.

Teaching and planning also require careful organization and coordination of information, methods, and activities to make the subject area or plan both relevant and stimulating. In order for citizens and students to better understand the workings of their community (along with knowing those people in charge of planning for a better community), they must have facts presented to them clearly and concisely. This requires a good job of packaging, in which the subject area is well-illustrated through examples, pictures, graphics, and/or audio-visual media manipulation. A well-organized and executed plan or teaching unit invites user participation and comment. Any reaction, whether positive or negative, indicates that people have been made aware. Positive comment is obviously a desirable reaction, but negative reaction can be valuable too. The teacher or planner may not have been aware of a serious deficiency, either communicative or informational, and the subject area can be re-evaluated and revised.

It is also helpful for subject areas and plans to be coordinated with operations in other departments. In many cases, plans have failed or classes have been unsuccessful when they were incompatible with or duplicated other areas of interest. This is where coordination enters the planning or teaching process. Since it is well known that many public agencies or governmental levels can be involved in similar and overlapping areas, coordination of effort is the only logical way to solve widespread and complicated problems. Likewise, there are more opportunities for interdisciplinary integration of subject matter in schools. Careful coordination among the subjects will allow student exposure to a wide range of facts and viewpoints. There is the need for coordination among individual teachers within the same discipline, for example, physical science and biological science; between disciplines or departments, like natural and social science; and between the teachers and the administration.

Educators as Planners

Education, whether formal or informal, provides the basis for understanding social and natural systems and their interrelationships with each other. In the past, schools have given their students experiences in environmental education through activities such as bottle bans, designing nature trails on school grounds, participating in community clean-ups, or writing letters of concern to elected officials. While these activities are important, a carefully coordinated and planned environmental education program is needed to prepare students for adult citizenship.

School teachers and administrators, as planners themselves, have the responsibility of establishing curricula designed to equip students with a basic understanding of and concern for the environment and the ability to live in a more complex world. This means critically examining those public institutions which directly affect our perceptions of the environment. Institutions, such as our laws and economics, have been formed to manipulate the man-made environment (houses, roads, cities, etc.) and the natural environment. By sharpening the understanding and perception of the students' environment, and improving comprehension of their cultural heritage, teachers can aid students in developing the knowledge, attitudes, and behaviors that will result in improvement of society and its institutions. This calls for an integration of the natural and social sciences.

ducation is the conservation of man; all of our future scientists, economists, historians, conservationists, and politicians are presently in our schools (Brandwein, 1966). Much of our public policy and practices are in reflection of the quality of education gained as students. Educators, in order to ensure quality environments in the future, must be aware of the need for quality environments in their schools. By allowing students to participate in stimulating and relevant school activities and form their own values based on the prime concern for the relation of man to the environment, future decisions by these future citizens and leaders can reflect this concern.

The education process should not end at the school's boundaries. Education officials and teachers can be instrumental in fostering community awareness, facilitating interaction among citizens, and between citizens and their governing bodies. Schools have access to the latest and most accurate environmental information and can assist communities in investigating real problems within social and ecological contexts. Based on their assistance, decisions can be made, alternatives developed, and final solutions reached which are acceptable to society.

Educators must plan and provide quality learning environments for their youth; adequately trained instructors to teach them; organized, efficient, and concerned administrators to implement and run the programs; and constructive community interaction utilizing the resources and experiences of the education system and community.

Pertinence to Subject Matter Already Being Taught

Many teachers do not have the time or resources available to develop an entirely new teaching unit on regional environmental planning topics. An examination of the classes already being taught might reveal various subjects which could be enriched by the inclusion of environmental topics or issues. A class in geography which is currently studying the distribution of world vegetation may look at man-caused disruptions, such as the Sahara Desert or the "Dust Bowl". The teacher might be able to lead a discussion on the planning implications, for example: what could be done about the current situation or how could we use the "Sahara experience" to prevent irreversible changes elsewhere in the world? A physics class may examine the effects of industrialization on modifications of microclimates and discuss the long-range implications of climatic changes. A chemistry class might study water sampling and analysis techniques as a practical addition to laboratory work. The list of possibilities for inclusion of environmental subjects is limited only by the teacher's knowledge, imagination, and motivation.

It is important for the teacher to recognize areas where added material can be both useful and interesting without being trivial. The fine line between "need to know" and "nice to know" is left to the teacher's individual discretion, the applicability to the original subject matter, and the level of class comprehension. Many times, a difficult subject can become more understandable by inserting recognizable examples that stimulate class discussions. Also, the subject might be attacked from a fresh angle using this approach.

Understanding the use of this technique allows teachers to examine their subject for appropriate places to insert environmental concepts. They may read about and investigate an area and prepare for questions which might arise. Outside assignments or class activities can also be developed based on the more interesting or relevant topics. Eventually, the teacher may have enough sources, information, activities, and expertise to develop and implement a completely independent course.

Some Easy First Steps: A suggested procedure could involve an examination of the daily or weekly lesson plan for certain subject areas which may lend themselves to current events or controversies of an environmental nature. A check with local newspapers, magazines, or television can help indicate which issues may be worthwhile for inclusion. Library research may be necessary to clear up technical difficulties. Check with other teachers who may have experience or know where to go or who to consult. You may even induce one of your colleagues to address your class on a particular topic. It may be helpful to contact local officials from a university, planning commission, city council, county commission, etc. for information, guidance, or to invite a guest speaker. Such officials are usually happy to visit local schools and speak with students. They may also bring interesting handouts which could stimulate further discussions with the class.

It is important to keep the planning process in mind when selecting a subject area. While it is desirable to be aware of environmental topics pertaining to the particular subject area, it is also of value to lead the discussion toward the planning implications of each topic. Below are two examples of how this process may work:

Example 1: A biology class is studying the forms of plant and animal life found in lakes and streams. The students have been examining ecological interrelationships such as food webs, trophic levels, and succession, so they are aware that the makeup of aquatic life can change over time. A discussion of the effect of fertilizers on water quality can be initiated. Lake lot owners who use too much fertilizer on their lawns can cause a decrease in water quality and affect the aquatic life. Heavily fertilized runoff or ground water will cause an overgrowth of algae; when the algae dies, oxygen is used in decomposition; there is less oxygen available for fish or for the living things they need for food. What are the environmental implications? As a result of water pollution caused by over-fertilization, the ecological balance of a lake is disrupted, desirable forms of life are killed, and the lake owners are prevented from using the lake for their enjoyment. What are the planning implications? A lake association may have to be formed to levy assessments and clean up the lake. Help from local experts may be necessary. A different type of fertilizer and other management practices may have to be used in an overall plan to improve the quality of the water.

Example 2: A class in government is learning about the legislative process. After following the procedure of how a bill becomes a law, it may be interesting to discuss how a particular piece of legislation was passed within your own state. Environmental bills, such as a ban on throwaway bottles or a curb on high levels of power plant emissions, can be used as examples. It may be helpful to discuss the political, social,

economic, and environmental considerations under which such a bill was sponsored; who sponsored the legislation and why; what citizen groups actively supported the bill; and the debates, both in the legislature and at public hearings, that the proposal inspired. What are the environmental implications of the law? Who was affected, positively or negatively by the law? What are the planning implications of a pollution control law, for example? A legal requirement has been established under which governmental bodies must plan certain procedures for eliminating sources of pollution. New industries must be designed for efficient and clean operation, existing industries must modify their processes to achieve similar results. A reasonable timetable for compliance must be planned. Citizens affected by the law require the planning of new social services, etc. These are but a few examples of where such a discussion might lead.

Planning and Implementing New Courses or Units

The development of a new course or instructional unit involving regional environmental planning or related subjects requires a large amount of personal motivation. It is helpful to have a good idea of the subject area, but don't be too concerned if you aren't an expert in the subject. Part of the fun of forming a new course is exploring the subject to learn as much as you can about it. Your enthusiasm can become contagious among your fellow teachers, your administrators and, ultimately, your students.

The importance of identifying a need for a new course must not be overlooked. This is another area where personal motivation is required of the teacher. You may have the desire to teach a particular subject that, unknown to you, is already adequately covered in another class; communication with other teachers will not be a waste of your time. Researching the subject area in education-oriented publications such as The Science Teacher, Journal of Environmental Education, and Education Resources Information Center (ERIC) publications may help you identify potential subject areas. Such publications may also include suggested study plans which will make your job a little easier. Talking with the students themselves will help you identify their particular areas of interest or areas where they need more assistance.

After you have identified and outlined a study plan, you may wish to discuss the plan with other teachers. If possible, work closely with a few other teachers while developing your ideas. By communicating your subject matter and intent to your peers, you will have the benefit of their reactions and criticisms. They can provide you with support, feedback, and information you may have overlooked, especially if there are points in your proposed unit which are related to their specialty areas. For example, an earth science teacher developing a unit on solid waste disposal may want to include some inputs from economics, government, or social science; or a social studies teacher who wishes to examine energy policy may need help from the science teacher on the effects of environmental controls on energy use.

It is important to communicate your ideas to the department head or principal as soon as possible. This can be done on an informal basis even before your proposal is drawn up. By getting administrators in on your unit planning,

you are opening up new sources of information and assistance which will help round out your teaching unit. If administrators have a good idea what your intentions and objectives are, and if they have taken an active part in the planning, your formal proposal will be more acceptable to them.

At this point, you may have stirred enough interest among your fellow teachers to try a team-teaching approach. An integration of several areas within a single orientation or discipline such as chemistry, geology, or biology can be sufficient to deal with a natural science problem. Another desirable approach would be combining social science and natural science disciplines. (Regional environmental planning becomes a more valid process when a similar integration is achieved.) An organized and cooperative team teaching approach gives the students experience in several aspects of a problem area and exposure to differing viewpoints. It may also be more acceptable to department heads or other administrators who have final approval over adding the course.

Your preparation, organization, and enthusiasm will help determine if your course proposal is acceptable to the school administrators and decision makers. In addition to the preceding aspects, administrators must consider applicability to required subject areas, relevance to local and school issues, school budgets, and available resources. By providing for these areas in your proposal (e.g., relevance to a requirement for a current events class; students may bring in materials--newspapers, magazines, etc.; or the school library carries the needed texts) you can assist the decision makers in their function without taking their time. Remember, one of the most important aspects of the proposal is indicating to the administrators how this new course or unit will benefit the students based on an identified and documented need.

Enlist the aid of others whenever possible. Consult with experts in your subject area, communicate with students on their needs and interests and with other teachers for suggestions on content or methods, talk to local leaders and ask them if they would consider donating their time to address your class. Make sure you include the practical side of the subject to your students: how the problem area will affect their lives; how they can deal with environmental problems; how regional environmental planning can improve the quality of their environment and their lives.

Sources of Information: Where to Go and What to Use

The following is a partial list of information sources which are available to help teachers initiate teaching about regional environmental planning topics. The list gives sources of written materials which can be obtained by teachers along with agencies or organizations which have resource persons who can provide information on pertinent topics. More detailed information sources will be available in the Supplement to this Guide which is described on page 1.

1. News Media
   - newspapers
   - magazines
   - television
   - radio

2. Maps and Charts
   - regional planning commission
   - city planner
   - state agencies

3. Planning Periodicals
   - planning commissions
   - local, state universities
   - libraries

4. Environmental Topics and Issues
   - periodicals, books, magazines, and newsletters
   - local, state, or national chapters of environmental interest groups such as
     - Audubon Society
     - Sierra Club
     - Public Interest Research Groups
     - Friends of the Earth
     - Earthwatch (United Nations)
     - National Wildlife Federation
     - American Lung Association
   - local, state universities
   - planning commissions
   - state department of natural resources or conservation
   - National Technical Information Service
   - Education Resources Information Center

5. School and Public Libraries
   - books and journals
   - annotated bibliographies
   - reader's guides
   - periodicals

6. Local Governing Bodies
   - city council or mayor's office
   - city planning commission
   - village supervisor
   - local zoning board
   - local business leaders
   - local industries

7. Regional Organizations
   - council of governments
   - township supervisor or planning commission
   - county commissioner
   - regional planning commission

8. State and National Organizations
   - governor's office
   - state planning commission
   - Council of State Governments, Lexington, Ky.
   - League of Women Voters
   - information services of political parties
   - Environmental Protection Agency
   - other State and Federal departments such as:
     - Departments of Agriculture, Interior, Housing and Urban Development Soil Conservation Service, and Highway Department
   - Attorney General's Office - for legal information
   - Office of Technological Assessment
   - legislative branches--House, Senate of State, Federal government
   - Cooperative Extension Service
   - American Society of Planning Officials
   - American Institute of Planners

Regional Environmental Planning: Organizing Instruction and Activities

In the previous sections of A Guide for Teaching Regional Environmental Planning, some background information has been provided for teachers regarding (1) an understanding of the planning process, (2) a basic understanding of seven planning topics concerning regional environmental planning (listed below), and (3) several ideas of how to introduce teaching units pertaining to these areas:

- land use
- solid waste disposal
- wastewater treatment
- air and water pollution
- water supplies
- recycling
- transportation

This section has been included to assist teachers in specifying important objectives for teaching regional environmental planning topics. Objectives for two topics, land use and solid waste disposal, are provided as examples. Limitations of the scope of this project and space available in this booklet preclude development of objectives for the other five topics, but teachers, curriculum planners, and instructional developers may expand on the pattern given here when developing other subject areas or topics. Following each objective are suggestions on where to find information and a few activities are added to illustrate each objective and suggest instructional procedures. Clearly, more are needed if each topic is to be taught effectively.

Concluding this section are several tips of organizing the objectives and recommended methods for evaluating your teaching unit and students. These methods include testing, class participation, and outside assignments.

Land Use

Land use is a basic issue in regional environmental planning because each of the seven other topics is closely associated with it. The way we use our land and land resources directly affects air, water, and land quality.

OBJECTIVE 1: Students should be able to identify criteria for good and poor land use practices.

Suggested Activities:

1. Ask students to list ways we use our land in various parts of the country. Also, have them list ways land is used within 50 miles of their home: some examples of land uses which could be investigated include farming, ranching, forestry, industry, residential, recreation, wildlife habitat, etc.

2. Ask students to give examples of "good" and "poor" land use practices. Why are some considered good, others poor?

3. Introduce objective reading assignments, discuss what the students are to look for such as criteria and examples of good and poor land uses.

Suggested readings:

Silent Spring by Rachel Carson
The Quiet Crisis by Stewart L. Udall
Small is Beautiful by E.F. Schumacher
A Sand County Almanac by Aldo Leopold
Design with Nature by Ian L. McHarg
Environmental Pollution by William A. Andrews

Students can discuss sections of any chosen book: how does the book (or any specific topic) apply to the local scene; are examples of good and/or poor land use practices readily identifiable?

4. In a class discussion, have students identify different land use patterns both past and present and help them examine reasons for different land uses. (Examples: need for resources during times of war or economic depression, need for food, etc.) Also, have the students analyze how our values affect the way we use land.

5. Ask the students to speculate on future land use patterns and needs. Have them justify alternatives in terms of factors which influence land use.

6. Now have the students examine some specific local or regional land use practices. Have them "classify" the land uses based on a set of criteria for evaluating land use. This may also be a good place to introduce the various planning simulation games and have the students participate in their own land use decision making. Suggestions: "Man in His Environment," Coca-Cola;"Water Pollution Game," Urban Systems; "Investigating Your Environment," U.S. Forest Service; "Redwood Controversy", Houghton-Mifflin Company.

7. As a summary activity, have students define "good" and "poor" land uses; ask them to show how their ideas have changed over the course of the investigation and discussion.

OBJECTIVE 2: Students should be able to list reasons why there should be public concern over the ways in which land is used.

Suggested activities:

1. Examination of changes in local land use patterns.

   a. For a particular parcel of land, such as one's homesite or school site, have students determine how that land was used 200, 100, 50, 5 years previously. What sources can you identify to acquire this information? (Hint: local historical society, long-time residents, government offices, library records, etc.).

   b. For your community, have students determine population changes that have occurred over the last 1-100 years; what changes in land use patterns has this population change caused?

   c. Given these changes in land use, ask students to identify probable changes which have occurred in the vegetation and wildlife of the community.

   d. Have students search out future projections and expectations for population levels and land uses for your community. What sources of information can be used? (Hint: local government, local planning commission, county or regional planning commission.

2. Examination of changes in land use patterns over a wider area (other communities, region, state, national).

   a. Have students determine population changes and resultant changes in land uses for selected area (Sources of information: library, state or regional planning commissions; university departments, etc.).

   b. Have students search out legislation and policies that affect land use in your state or region. This should include Federal, State, County, and Municipal legislation. In addition, land use policies of state agencies such as highway and park departments should also be included.

   c. Have students identify future projections and expectations for population levels and land uses for the selected area. Information can be obtained from newspapers and magazines, government information services, etc..

3. Examination of reasons the public should be concerned about land uses.

   a. In a class discussion, review criteria and examples of "good" and "poor" land use practices as in OBJECTIVE 1.

b. Work with students to identify the key contemporary issues and problems we face in our local community, region, state, and nation concerning land use? (Hint: impacts of development, private vs. public direction of land use).

c. Ask students to list ways in which people can affect land use decisions. Some possible actions include attending public meetings, data gathering and presentations on land use issues or legislation, and letter-writing campaigns to local, county, state, and federal representatives. Discuss issues and alternatives, costs associated with various alternatives, and have the class make a list of their priorities. (Hint: another good place for a simulation "decision making" game. Have students assume "roles" e.g., local farmer, developer, citizen "action" group, state senator, mayor, merchant, etc., to debate issues of land use and public concern, such as a new park, subdivision, industry, landfill, reservoir, highway, or power plant.)

Solid Waste Disposal

Over the years, we have increased our production of solid wastes to the extent that the environment is becoming less able to accommodate these larger amounts. There is also the question of what happens to potentially dangerous materials which may contaminate our air and water if improperly disposed. Currently, the majority of our solid waste is handled at landfills, but an examination of alternative methods is also helpful.

OBJECTIVE 1: Students should be familiar with various forms of solid waste and the methods used to dispose of them.

1. Have students list materials we throw away. In other words, have them identify the various waste materials generated by businesses, industries, and residences in the community? Things to find out: types of materials (paper, metal, glass, chemicals) amount of each generated per day, week, year?

2. Have students trace the fate of materials after they are thrown away. Find out where solid waste is disposed, e.g., dump, sanitary landfill, incinerator. How much does the present method cost each person in the community per year? (Where to go for information: local public service department, local government offices, planning commission, private refuse hauler). Activity: arrange visit to local or regional solid waste disposal facility.

3. Ask students to identify and evaluate different methods of solid waste disposal, listing advantages, disadvantages, and costs of each. Individual topics can include health hazards, methods of selecting disposal sites, environmental impacts, and social impacts. (Sources of information: county health department, local or city engineer, library).

OBJECTIVE 2: Students should be able to identify the various problems associated with locating and operating sanitary landfills in their community or region.

1. Through the use of topographic, soils, and subsurface geology maps, have students locate potential sites for sanitary landfills. Give students a list of physical constraints: depth to water table, minimum amount of low-permeable materials, minimum distance to existing wells and human habitation, etc. After several sites are selected, environmental and social impacts of the landfill can be discussed.

2. Discuss social, political, economic, and legal implications of landfills: How will the necessary land be obtained; by purchase, lease, or condemnation? Discuss advantages and disadvantages of each. How long will the landfill be usable before the community will have to seek a new landfill site or alternative disposal method? How will the community "educate" its citizens about the need for a landfill? What happens to property values near landfills? Who takes care of potential landfill problems such as order, dust, fires, rodents, and what methods are used? (Information can be obtained from government offices, local and regional planning commissions; by visiting landfill sites; and from the library.)

3. Have students examine future solid waste disposal problems of your community. Are present methods sufficient to take care of needs in the foreseeable future? What will happen to the landfill site after it has reached capacity? How long does the community have before a new location or method for solid waste disposal is needed?

OBJECTIVE 3: Students should have a basic understanding of solid waste problems and solutions in other communities, the region, the state, and the country.

1. Have students review books and articles from newspapers and magazines as a way of understanding the immensity of the task of solid waste disposal and alternative approaches being proposed in other parts of the country. Students should describe examples of alternative actions for solid waste disposal that are being used in other parts of the country and abroad. This would include generation of power, recycling materials, and land reclamation. They can evaluate these methods for possible local application. Activities: examine laws pertaining to solid waste disposal, analyze new techniques for disposing of solid wastes and reclaiming lands.

Tips for Organizing Your Objectives

(1) Whenever possible, look at problem areas from both local and general perspectives and attempt to show how local problems are examples of wider scale problems. For example, traffic congestion at a rail crossing or bridge in your home community is an example of a worldwide problem faced by people in any community with a river or a railroad. Relate how local needs influence decisions made at regional , state, and national levels, and how these decisions affect local situations.

(2) Examine the historical background of each problem area to show its relation to present conditions. In simpler terms, attempt to show how each specific problem came into being.

(3) Identify and examine alternative proposals and solutions which have been suggested for dealing with each problem situation; analyze and appraise the consequences of each alternative for social, economic, technological, and environmental impact.

(4) Discuss ways the students, as citizens, can take an active part in the decision making process involved with each problem area. This includes:

a. developing an understanding of the issues,
b. acquiring accurate, unbiased data,
c. analyzing points of conflict,
d. engaging in problem solving, and
e. influencing decision making through communication with decision makers.

Evaluating Your Teaching Unit

Much has been written about evaluating the objectives and results of a teaching unit through a measurement of student progress. Most commonly, tests measure (1) the memorization of facts, (2) the understanding of and the ability to apply generalizations, and (3) the degree to which students have adopted attitudes and methods demonstrated to them. All of these methods are important when teaching regional environmental topics. The purpose of introducing such topics is to help develop an informed and concerned individual who can ask intelligent questions, display an open-mindedness in complicated situations, and weigh evidence before jumping to conclusions in environmental matters. Developing tests which will evaluate the students' abilities in these areas will also be a direct measurement of the validity and practicality of your teaching unit.

Along with direct testing, other evaluation methods have been suggested. One of these includes directly observing responses to the material you present, either through teacher-initiated or student-initiated questions. Although this method allows for more personal communication between the student and the teacher, it may tend to become dominated by a handful of students to the exclusion of others. Outside assignments such as chronologies or diaries of material-related experiences can also be helpful. If students are required to gather outside information on environmental topics, a diary of their procedures and contacts may be valuable to both student and teacher. Essay exams which allow the students to give free response to environmental situations and problem areas are another excellent method of evaluating both the students' perception of the problem and some insight into their behavior about a particular topic. A slight modification of this procedure could include introduction of the topic area, a "pre-test" to measure the students' initial perceptions of a problem, presentation of learning activities and an integrating or generalizing experience, a post-test, and a student appraisal of the unit to allow students to give inputs on strengths, weaknesses, and areas needing improvement in the unit. The students will often have valuable constructive criticisms of both the course content and how it was presented.

By using a combination of these evaluation methods, the teacher can measure the effectiveness of each teaching unit in realizing its objectives. As a result, the process of implementing regional environmental and planning topics in school curricula can be valuable, exciting, and rewarding.

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APPENDIX

Regional Environmental Planning Workshops:

Topics and Guest Speakers

1st Workshop - Michigan State University
October 25, 1977

1. Overview, procedures and objectives of Workshops.
2. Mapping exercise - Tri-County Region Familiarization.
3. Ms. Donna Stein - Office of State Representative Stephen Monsma. Slide-tape presentation of land use legislation in Michigan; land use planning within a region.
4. Land use simulation games.
5. Mr. Herb Maier - Executive Director, Tri-County Regional Planning Commission: presentation on regional planning and the organization and functions of the TCRPC.
6. Dr. Sanford S. Farness - Professor, School of Urban Planning and Landscape Architecture, M.S.U.: presentation on planning theory, regionalism, and environmental planning.
7. Question-and-answer session, group discussions, planning actions for schools; workshop evaluation.

2nd Workshop - Clinton County Participants; St. Johns, MI Nov. 15, 1977
Eaton County Participants; Charlotte, MI Nov. 22, 1977
Ingham County Participants; Mason, MI Nov. 29, 1977

1. Development, presentation, and group interaction - Transportation Modeling.
2. Gordon Szlochetka - Chief Planner for the Tri-County Regional Planning Commission: presentation of the long range transportation plan for the Tri-County Region; question-and-answer session.
3. Development of governmental decision making
4. Ms. Virginia Zeeb - Clinton County Commission Member
   Mr. Robert Clarke - Eaton County Commission Member
   Ms. Carlene Webster - Ingham County Commission Member; presentations and discussions on political decision making pertaining to each county and the region as a whole.
5. Curriculum planning strategies and workshop evaluation.

3rd Workshop - Michigan State University
January 17, 1978

1. Mr. Sol P. Baltimore - Director of Environmental Health, American Lung Association: presentation on air quality in Michigan and materials for teachers.
2. Thomas Looby - Associate Planner, Tri-County Regional Planning Commission: presentation on the Tri-County Region's 208 Water Quality Management Plan.
3. Dr. Darrell L. King - Institute of Water Research, MSU: presentation on "Water Quality: Past and Present."

4. Dr. Dennis P. Tierney - Michigan Environmental Review Board, Michigan Department of Natural Resources: presentation on water and air quality in Michigan.
5. Group Seminar Options:
   (1) Ms. Mary Moore - Millipore Corporation: "Equipment for Air and Water Testing for Middle School and High School Students."
   (2) Dr. Richard McLeod - Science and Mathematics Teaching Center, M.S.U.: "Change Agent Strategies".
   (3) Dr. Martin Hetherington - Science and Mathematics Teaching Center, M.S.U.: "Use of Games and Simulation in the Classroom."
   (4) Dr. James J. Gallagher - Science and Mathematics Teaching Center, M.S.U.: "Curriculum Development in Environmental Planning."
6. Planning Actions in Schools and Workshop Evaluation.

4th Workshop - Michigan State University
February 14, 1978

1. Mr. Tim Wright - Resource Recovery Division, Michigan Department of Natural Resources: presentation on solid waste treatment and management.
2. Curriculum development in solid waste management - participants were divided up into grade levels and subject areas to discuss curriculum development in their schools.
3. Mr. Thomas Looby - Associate Planner, Tri-County Regional Planning Commission: presentations of solid waste management and water table levels in the Tri-County Region.
4. Curriculum Development in Water Quality and Air Quality.
5. Hon. Lynn Johndahl - State Representative of Michigan: "Use of the Political Process", presentation and question-and-answer session.
6. School curriculum planning and workshop evaluation.

5th Workshop - Ingham County Participants; Mason, MI March 7, 1978
Clinton County Participants; St. Johns, MI March 14, 1978
Eaton County Participants; Charlotte, MI March 21, 1978

1. Review of the content of past workshops; individual discussion groups formed to investigate ways of introducing regional environmental planning topics in local schools:

   Land use planning
   Transportation
   Air quality
   Water quality
   Solid waste

2. Each group presents the Action Plan Report on their selected topic.
3. Planning actions in the schools and workshop evaluation.

6th Workshop - Michigan State University
May 9, 1978

1. Mr. Jon Coleman - Chief Planner, Tri-County Regional Planning Commission: presentation on what has been done and what is yet to be done in the Tri-County Region.
2. Dr. James J. Gallagher - Director, Science and Mathematics Teaching Center, M.S.U.: "How to Put Regional Environmental Planning in your Curriculum."
3. Hon. Stephen Monsma - State Representative of Michigan: presentation of state land use planning legislation; question-and-answer session.
4. Dr. Martin Hetherington - Science and Mathematics Teaching Center, M.S.U.: "The Teacher's Role in Environmental Planning."
5. Dr. Sanford S. Farness - School of Urban Planning and Landscape Architecture, M.S.U.: "What is happening in Regional Planning", overview and summary of workshop content.
6. Evaluation and discussion of the workshop project, presentation of awards to the participants.

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A REQUEST FOR FEEDBACK

This Guide for Teaching Regional Environmental Planning was an outgrowth of an inservice teacher education project sponsored by the Office of Environmental Education which is part of the U.S. Office of Education. The Guide should not be considered as a finished document as it was not the main objective of the project. Rather, it is an attempt to share ideas and experiences with peers in environmental education so that further development of the potential of regional environmental planning may occur. Therefore we would like your feedback on the following questions:

1. For what purposes did you use the Guide?
2. What are the Guides' strong points, weak points, serious omissions, and errors?
3. What specific resources and information should be included in the Supplement to the Guide?

We will be appreciative if you would take a few minutes and send us a letter with answers to these questions and any other feedback that you would like to provide.

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